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THE POSTULATES OF DEDUCTIVE LOGIC

ONE of the greatest dangers to cogency in thinking is the intrusion of irrelevant ideas; and one of the great advantages of mathematical notation has been that it helps to exclude irrelevancies. This advantage is much increased, now that mathematical scholars are generally aware that their symbols mean no more than the postulates and definitions make them mean. For the common-sense associations which formerly did so much to introduce unwarranted assumptions into the reasoning, especially in geometry and mechanics, are now effectually guarded against, although they still serve their old function of suggesting possible combinations.

There are two means by which the meaning of symbols can be fixed. One is definition in terms of symbols whose meaning is already fixed. The other is the exhibition of a set of standard formulæ in which the symbols in question occur, and which constitute the authority for their use on all occasions. Both methods are used in our dictionaries in fixing the meaning of the words of the various languages. It is obvious that in the case of words the latter method is the fundamental one. It is common usage that gives words their meanings, and the definitions have to be framed accordingly.

These same methods are followed in mathematics; but the endeavor is made to give the definitions and standard formulæ such exactness and clarity that no error in their application can occur except by reason of inattention or forgetfulness; and, furthermore, the two methods are treated as mutually exclusive alternatives. Definition is used wherever possible; and only where definition can not be used is resort made to a set of standard formulæ—the postulates.

But the usage of words in ordinary language is not simply an employment of words in various combinations with each other. It is the employment of them in appropriate situations. It is from the external connection of words with things and feelings that, in the last resort, all the meaning of words is derived. Now in mathematical procedure all such external connections are *as far as possible* avoided. It is the standard usage of the symbols in connection with each other that is expected to guide all further usage.

The various branches of mathematics may be viewed as a series of deductive systems, presupposing one another in a certain definite order, and with each later system characterized by a new set of postulates in which new "indefinables" occur. Thus geometry, while presupposing arithmetic, may be viewed as requiring for its establishment ideas and assumptions that are foreign to arithmetic. This conception of geometry was, in fact, universal until recently, and it is still very frequently adopted. It is now, however, generally recognized that this conception is not necessary—that geometry may be so universalized that it contains no radically new ideas or principles at all, and thus takes its place as a part of pure mathematics, resting upon no other basis than the postulates of deductive logic.

Now in the organization of deductive logic itself as a deductive science, it is such sciences as geometry that have served as the pattern. Perhaps, therefore, it may help us to a better understanding of the postulates of deductive logic, to consider briefly what has recently been made clear with regard to the logical status of the postulates of geometry.

That these postulates are not asserted propositions has long been recognized. The old controversy over the "parallel-axiom" of Euclidean geometry is responsible for that. The "axiom" might be assumed, or an alternative might be assumed, and geometry went on its way quite merrily in either case. It therefore came to rank as an assumption with whose truth or falsity geometry was not concerned; but it still remained open to question whether it was indeed true or false. For a time, indeed, the case of this "axiom" was regarded as exceptional. But it was finally seen that this was not so—that any of the "axioms" might be altered or replaced, and a geometry of some sort still remain. A further step was involved in the recognition of the possibility of diverse interpretations of the assumptions, some of which might be true and others false. Thus the "parallel-axiom," whether it be true or false in its common application to physical space, is certainly true in its analogous application to the "space" whose "points" are ordered sets of real numbers. The science, meanwhile, remained perfectly indifferent to these different interpretations. It concerned itself only with deducing the consequences of the postulates in their symbolic form. The postulates were no longer capable of truth or falsehood. They were conventions subject to the arbitrary choice of the mathematicians.

This view, however, was found to be short-sighted. In the first place, such a postulate as the "parallel-axiom," even though it be expressed in peculiar symbols that are not found in ordinary dictionaries, is not thereby wholly cut off from those external connec-

tions which, as has been said, give words their meanings. A set of geometrical postulates need contain (or presuppose) only two indefinables that are peculiar to the subject: say, *point* and *between*. All the other indefinables are such as occur in all intelligent discourse. These others, in the formal statement of the postulates, may be expressed in common words, or new symbols may be invented for them; but if new symbols are used they must first be explained in ordinary language. The use of new symbols to express these ideas could only have the advantages of brevity and (perhaps) of unambiguity. Thus, even anterior to any particular interpretation, the postulates are not wholly unintelligible. Suppose, for example, we read: "If p, q, and r be each any ς, and if p λ the collection q and r, then q does not λ the collection p and r." Now this may be the first time we have ever seen the symbols ς and λ, and we may not have the faintest notion how to pronounce them. But we know the meaning of all the words and punctuation marks that occur; we know that ς is a class-name and that λ stands for some relation; and we know that p, like q and r, is intended to denote the same ς throughout. If this be one of a set of postulates, we observe further that these same symbols appear in the other postulates, and that the only connection in which ς's are mentioned is either their mere existence or their occurring (or not occurring) in the relation λ.

Hence, instead of the postulates being either (1) propositions asserted to be true; or (2) assumptions, which may be true or false, but which are made in disregard of their actual truth or falsity; or (3) mere formulæ, which are meaningless till some particular interpretation is given them; they are more properly to be regarded (4) as the perfectly intelligible description of a certain class of relations, or, what amounts to the same thing, of the entities which enter into this class of relations. For example, the above postulate might be expressed: "Let us consider the class of relations which a single term may bear to a pair of terms, and which are asymmetrical as respects the single term and either member of the pair." The remaining postulates would give further particulars of the description; or, by providing for the existence of terms between which such relations obtain, they would by implication assert that all the various parts of the description are consistent with one another. In present-day practise, however, the consistency of the description is always proved by pointing to some actual exemplification; and the example is always, in the last resort, some combination of numbers.

But the complete description of a class of relations is its definition. Hence, in the case of geometry, the "indefinables" are not absolutely such. They are simply assumed as indefinable for the science. And the set of postulates, by means of which the employ-

ment of the "indefinables" is fixed, reduces upon examination to an instance of the other mode of fixing the employment of symbols.

How is it, then, with the postulates of the fundamental branch, or rather trunk, of mathematics—deductive logic? Their difference from geometrical postulates appears in the fact that if uninterpreted symbols are substituted for the logical terms, nothing but rows of symbols remains. These can not, then, be translated into a general description of something or other, for there is nothing to take hold of upon which a translation might be founded.

Can they then be treated as a set of symbolic formulæ awaiting interpretation? Let us see.

Imagine a sheet of paper covered with a variety of marks which are repeated in different combinations in different lines. Imagine, further, a set of directions setting forth the conditions under which anyone may, if he please, write similar lines of marks on an indefinite number of other sheets of paper. These directions must be extraordinarily explicit, no possible room for misunderstanding being left open; and they must, of course, be expressed in intelligible language. By this I do not mean that they will contain nothing but words; for they must contain the marks the employment of which they direct. The first direction will be that nothing shall be set down except as shall be thereafter distinctly permitted; all the remaining directions will express positive conditions.

Under these circumstances you might proceed to cover a considerable number of blank sheets with these (to you) meaningless marks. You might develop much cleverness in seeing possible combinations; and you might thus devise new directions leading by short-cuts to results which the original directions invariably authorized. The devising of these short-cuts would perhaps take up a very large part of your efforts; and you might fill up many note-books with your record of them, and your proofs that they did indeed involve no transgression of the original directions. These proofs you would conduct as your mother-wit enabled you; and if you had ever studied logic you would doubtless check them up by such logical rules as you were acquainted with.

You might do all this without having the faintest idea what the marks meant or whether they meant anything at all. And then it might accidentally occur to you—I do not know how you could set about systematically to make such a discovery—or some one who already knew might call your attention to the fact, that those original rows of marks might be given a meaning: that they might be understood to indicate certain principles of logic; and that the directions laid down for making new marks would then be equivalent to a second set of logical principles, according to which inferences might be drawn from the

first set. At the same time you would bethink yourself that, for all you knew, the marks might be susceptible of an infinite number of other interpretations, and that the directions for making new marks might have to be variously interpreted accordingly.

This, so far as I know, would be a perfectly feasible enterprise. The directions for making new marks would have to cover in some way: (1) inference of the form, "p and 'p implies q' permit us to write q"; (2) substitution of variables for other variables whose range includes theirs (as, for example, "p is false" for p); (3) the use of parentheses or their equivalent, and the occasional dropping of parentheses; (4) the arbitrary framing of definitions and the substitution of either side of a definition for the other.

Such an enterprise would not only be feasible, but it might have a certain utility. For there would be a minimum of distraction by irrelevant associations, and hence a minimum danger of being led into unwarranted assumptions. The pages upon pages of rows of marks that were written would not have to be changed by an iota when the interpretation was made. It must be confessed that it would probably take a phenomenal intellect to get very far in the development, when all help from common experience was to this extent eliminated; and that such an intellect might very likely be better occupied.

But whatever utility such a treatment might have, we must not be blinded to the fact that the whole procedure would be *absolutely nonsensical* until the interpretation of the original marks was given; and that this interpretation is, from the standpoint of the manipulator of the marks, an *absolute accident*—as accidental as the interpretation of a well-fought game of chess as an argument for the immortality of the soul. And meanwhile the very manipulation of the marks themselves rests, of course, on the use of common speech in the directions; so that the natural imperfection of language, which has been pitchforked out of the rows of marks, flies back through this window.

It has been said that the enterprise of working out a mathematical logic without knowing what it meant, would require a far greater intellect than is likely ever to be applied to it. This circumstance, however, need not detract from a certain value which the very conception of such an enterprise may have for us. We may use this conception in the critical examination of the postulates of any proposed system of mathematical logic, asking ourselves whether they would equally suffice if abstraction were made from their significance; that is to say, whether certain of the postulates can be regarded as a set of meaningless marks, and the remaining postulates as a full set of directions for the writing of additional marks.

Thus the postulates of deductive logic stand upon a very different footing from the postulates of geometry. To geometry the interpretation of its primitive symbols is a matter of indifference—except that the possibility of at least one interpretation is necessary in order to ensure the mutual compatibility of the postulates. For deductive logic the interpretation of the symbols is logically prior to all else, for without that all else is nonsense.

Accordingly, it is impossible for deductive logic to cut itself entirely loose from the external connections of common language and its consequent unclearness. It should, indeed, be the aim of the logician to reduce this unclearness to the practicable minimum by the methods of the dictionary, troubling himself not at all by reason of the logical circles into which he is thus led. Imperfect as the explanation may necessarily be, it is an essential propædeutic to the system of logic—not, as some writers would have it, a mere concession to practical expediency. At the same time it is not to be forgotten that the postulates themselves, when once some vague meaning has been given to their terms, are a most potent means to the further clarification of their meaning.

I wish now to discuss two of the postulates, which, in certain recent systems of deductive logic, stand out prominently by virtue of the fact that they are expressed in words and not in quasi-mathematical symbols; and I wish particularly to examine the reasons that are given for the use of words. The two postulates are the *principle of deduction* and the *principle of substitution.*

M. Couturat, in the syllabus of logic which he has contributed to the "Encyclopedia of the Philosophical Sciences," states the former principle as follows: "If A implies B, and if A is true, then B is true (and we can affirm this independently)." And he adds: "We should be tempted to express this principle by the formula:

$$(A < B)(A = 1) < (B = 1),$$

but this formula is again an implication from which we can not extract the thesis $(B = 1)$ in order to affirm it separately except in virtue of this principle itself. And here we have a striking proof of the necessary limitation of symbolism when it is a question of formulating principles" (Vol. I, p. 143). To this I would reply:

(1) The principle of deduction, as M. Couturat has himself stated it in words, is itself an implication, from which the thesis "B is true (and we can affirm this independently)" remains to be "extracted"; and this, according to M. Couturat's own words, can only be done "in virtue of this principle itself." It may be added that either in the case of the symbolic formula or in that of the verbal statement, it would be well to leave the thesis unextracted; for, standing by itself, it is in general untrue.

(2) The symbolic formula, which M. Couturat suggests only to withdraw it, is in fact precisely equivalent to his verbal statement of the principle of deduction. The symbol "$<$" means "implies," or "if . . . then"; the symbolic expression "$=1$" means "is true"; and the placing of the two parentheses side by side means "and." Accordingly, the whole formula reads: "If A implies B, and A is true, then B is true." The only addition in M. Couturat's verbal statement of the principle is the phrase, "and we can affirm this independently." But even this is no real addition (as M. Couturat covertly recognizes by placing it in parentheses[1]); for the stating of propositions "independently" is our common mode of stating them as true.

In "Principia Mathematica" by Messrs. Whitehead and Russell, the principle of deduction is first stated with respect to what are there called "elementary propositions." They write: "*1.1 Anything implied by a true elementary proposition is true. Pp." (This last is the symbol for "primitive proposition.") And they comment as follows: "The above principle will be extended in *9 to propositions which are not elementary. It is not the same as '*if p* is true, then *if p* implies *q*, *q* is true.' This is a true proposition, but it holds equally when p is not true and when p does not imply q. It does not, like the principle we are concerned with, enable us to assert q simply, without any hypothesis. We can not express the principle symbolically, partly because any symbolism in which p is variable only gives the *hypothesis* that p is true, not the *fact* that it is true" (p. 99).

Now (1) the principle of deduction, as these writers enunciate it, is, in fact, precisely the same as the proposition from which they attempt to distinguish it. In the first place, the transformation from the one form to the other is simple and obvious. Let us take an analogous case: "Any son of a good man is good." This means the same as: "If y is a son of a good man, y is good." And this in turn means the same as: "If x is a good man, then if y is a son of x, y is good."

In the second place, the alleged difference between the two statements is illusory. When our authors say of the second that "it holds good equally when p is not true and when p does not imply q,"

[1] I have not seen the original French of M. Couturat's article, and the translator of this volume is not altogether trustworthy. But I have before me the statement of the principle of deduction in his "Les Principes des Mathématiques," and this may be literally rendered as follows: "If a true implication $p \supset q$ is given, and if the hypothesis p is true, then the thesis q is true also, so that we may affirm it independently." Here the "so that" (*de sorte que*), instead of "and," more explicitly recognizes that the concluding phrase makes no real addition to the principle.

this seems to mark a difference, especially since p and q do not occur in the first. But, as a matter of fact, no matter what p and q may mean, and no matter what relation is fancied between them, the first statement holds. It holds whether or not pigs have wings, and whether or not the Bishop of Barchester is henpecked. In other words, being true it is true—exactly like the second.

In the third place, the principle of deduction can in the one form, no more and no less than in the other form, "enable us to assert q simply without any hypothesis." Neither form will enable us to assert q by being used *as a general formula in which to substitute particular values.* Consider the propositions, "This is red," and "That is blue"; and suppose the first is true and implies the second. Then let the attempt be made to substitute these values in the principle of deduction. In the first form of the principle, substitution can not be made directly, because in it the variables are hidden under class-names. It must be put into some such form as the second, before substitution is possible. And then, when the substitution is made, we have merely: "If this is red, then, if 'This is red' implies 'That is blue,' that is blue." But in this proposition the truth of "This is red," and of the implication of "That is blue" by "This is red," is no longer asserted: it is only considered as a possibility. Hence, also, the truth of "That is blue" is not asserted.

On the other hand, of course, either form of the principle will "enable us to assert q simply," when it is used *as one premise of a deductive argument,* conducted according to the principles which govern such reasoning. We may, for example, argue: "Anything implied by a true elementary proposition is true. 'This is red' is a true elementary proposition. Therefore anything implied by 'This is red' is true. But 'That is blue' is implied by 'This is red.' Therefore 'That is blue' is true." But this is far from our authors' intention.

(2) The statement that the principle of deduction can not be stated in symbols is, accordingly, false. In the symbolism employed by our authors, it reads:

$$\vdash :. p \supset : p \supset q . \supset . q$$

which is, indeed, the direct translation of the second form of the principle considered above. (The first symbol is the sign of "assertion"; $\supset$ means "implies"; and the dots are used instead of parentheses.) Their remark, that "any symbolism in which p is variable only gives the *hypothesis* that p is true, not the *fact* that it is true," is simply beside the point. For in the principle of deduction we do not expect to find asserted the truth of any other proposition than the principle itself.

I conclude, therefore, that the reasons which M. Couturat and the authors of "Principia Mathematica" have given for the use of words in the statement of this logical postulate are unsound. The fact, nevertheless, remains that in building up their systems they have found themselves compelled to state it in this way—even though they had stated it in symbols elsewhere—and it is this fact that has led these acute thinkers into giving bad reasons for it.

The real reason for the fact, I believe, lies in the considerations which were presented in the first part of this paper. When once the fundamental premises of a system of logic have been set forth in symbolic form, the whole further construction of the system is carried through exactly as if the symbols had no meaning at all, or as if their logical meaning were only one of an infinite number of possible meanings. There must, therefore, be given a set of rules for the manipulation of the symbols; and these must be stated in intelligible language. For the authors whom we have been studying, the principle of deduction is one such rule.[2] When, however, the meaning of the symbols is recalled, the process of manipulating them is seen to be a process of deductive inference, and the rules of the process are seen to be principles of inference—just such principles as the whole system of logic is made up of.

So long, then, as the meaning of the symbols is borne in mind, is there any point in the separate statement of certain of the principles in words? I think not.

In speaking of the rules for the manipulation of symbols, attention was drawn to the obvious fact that in the use of these rules a man would have to reason. This necessity is not the least bit lessened when the rules are interpreted as principles of inference. No amount of knowledge of logic can enable us to dispense with thinking, though it may enable us to economize it. To be sure, this thinking, so long as it is correct, is such thinking as is in accordance with the principles of inference. But in order to justify it by those principles, *more* thinking must be done; and so on *ad indefinitum*. Thus the setting-forth of a set of principles of inference, by which deductions shall be drawn from another set of principles of inference, strikes me as a vain complication.

The authors of "Principia Mathematica," in the summary of *2 and under *2.38, distinguish carefully between the use of a proposition as a *premise* and its use as a general formula in which a particular substitution is to be made. (In this latter use, they speak of the proposition as a "principle of deduction" or "rule of inference,"

[2] It should be noted that in "Principia Mathematica" the comprehensive statement of the principle is not given before *9.12: "What is implied by a true premise is true. Pp."

which seems to me confusing, if not confused.) But in their system the verbally expressed postulate, which, following M. Couturat, we have called the "principle of deduction," is not used in either of these two ways. How is it used? It is a thousand times referred to, but it is not used at all.[3] It does, however, correctly (though only partially) describe a process of inference that must continually be performed in building up the system.

Only a few words need be added on the subject of substitution. In "Les Principes des Mathématiques," M. Couturat wrote: "That is not all: to this principle [of deduction] it is necessary to add the *principle of substitution:* 'In a general formula, a general or indeterminate term may be replaced by a particular or individual term.' That is evident, since a general formula has no value at all or even sense except in so far as it can be applied to particular terms. This principle, like the last, can not be translated by symbols, just because it is at the basis of the use of symbols; and, indeed, one could only express it, including the notion of 'particular term,' by means of general symbols [Strange that he did not see that this is equally true of the verbal expression!]; but to apply it to terms that are really particular, it would be necessary to substitute these for the general terms which represented them in the formula, which can only be done by virtue of the principle itself."[4]

On the other hand, "Principia Mathematica" gives no directions that specify when and how the process of substitution is possible. It merely declares: "In such cases [*i. e.*, where it is noticed that certain propositions are instances of general rules already given], these rules are not premises, since they assert any instance of themselves, not something other than their instances." This is almost too witty to be correct. When, for example, in *2.1, not-p (*i. e.*, the denial of the elementary proposition p) is substituted for p in the formula, "'p or p' implies p," making "'Not-p or not-p' implies not-p," it must not be supposed that the latter is *an instance* of the former. The truth, of course, simply is that every instance of the

[3] I must guard against misunderstanding here. So long as the meaning of the symbols is left out of account, this rule, like the other rules for manipulation, is indeed used. It is used as a premise, and deductions are drawn from it. When the symbols are given their logical interpretation, the rule might, indeed, continue to be used as a premise. But it would be obviously superfluous and ineffective; for, using it as a premise, one would have to do the same amount of spontaneous, undirected thinking that its use was supposed to obviate. Accordingly, the authors of "Principia Mathematica" never dream of using it as a premise. And, as we have seen, its use as a formula in which substitution is to be made does not suffice.

[4] In his encyclopedia article, he writes: "What is true of all is true of one in particular. This axiom is the well-known principle of all particular applications of general theorems" (p. 151).

latter is an instance of the former; and that is true because every instance of not-p is an instance of p (as the postulate *1.7 asserts). The process of substituting not-p for p in this formula is, therefore, more than a simple substitution. It involves a species of *syllogism.*

To make this clear I must go into some technicalities, for the full statement of the syllogism that is involved will differ according as one rejects or accepts the "theory of types" which "Principia Mathematica" advocates. If that theory be rejected, the original formula will have to be expanded so as to read: "If p is an elementary proposition,[5] then 'p or p' implies p." This would then hold, no matter what is put for p. Substituting not-p for p, we have: "If not-p is an elementary proposition, 'not-p or not-p' implies not-p." This, however, is not the result required. To obtain it we need the premise, "If p is an elementary proposition, then not-p is an elementary proposition." This combined with the preceding gives the required formula: "If p is an elementary proposition, 'not-p or not-p' implies not-p."

If the theory of types is accepted, the condition, "If p is an elementary proposition" need not be written. For, according to this theory, the truth of a general formula does not require that no matter what particular value is assigned to its variables the result must be a true proposition, but only that it shall be either true or nonsensical; and the conventions that are made with regard to the use of the terms "not" and "or" (and consequently with regard to "implies," which is defined in terms of "not" and "or") are such that this formula is nonsense except when p is an elementary proposition. The formula is, therefore, asserted unconditionally; for it is true for any interpretation of the symbol p for which it has a meaning. Anything whatsoever may, therefore, be substituted for p without danger of error. But that the substitution shall have any logical importance it must be known that the new formula is significant under the same condition as the old. By simple substitution, then, we write: " 'Not-p or not-p' implies not-p," and know that this is significant when not-p is an elementary proposition. By postulate *1.7 we know that if p is an elementary proposition not-p is also. Hence we infer that the new formula also is significant when p is an elementary proposition.

On the whole, then, we may say that though the formula in which substitution is made is not a *premise* (as the term is used in "Principia Mathematica," as well as throughout this paper), the complete

[5] As a matter of fact, if the theory of types be rejected, one will naturally prefer to state the wider formula: "If p is a proposition, 'p or p' impies p." But I follow "Principia Mathematica" as closely as possible.

process of substitution does, in such a case as the above, involve syllogistic reasoning from premises to a conclusion.

I will conclude by quoting with a word of comment a passage from "Principia Mathematica" (Vol. I, p. 94): "The purpose of the present section [Part I, Section A] is to set forth the first stage of the deduction of pure mathematics from its logical foundations. The first stage is necessarily concerned with deduction itself, *i. e.*, with the principles by which conclusions are inferred from premises. If it is our purpose to make all our assumptions explicit, and to effect the deduction of all our other propositions from these assumptions, it is obvious that the first assumptions we need are those that are required to make deduction possible." If deduction were not already possible, no array of assumptions could make it so.

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PRACTICAL VERSUS LITERAL TRUTH

THAT there exist in our current discussions and preachments many ambiguities due to needless inexactness of statement, and others due to the use of identical words in differing senses, we are all painfully aware. At best we may hope that time and a more general education will gradually produce a more accurate speech and a wider agreement in definition. But there is another form of ambiguity which it is not so easy to combat, which we may indeed consent to tolerate, because there seems no way to avoid it without an actual loss to mankind. This ambiguity consists in the danger of taking a practical truth for a literal truth. By a "practical truth" I mean a statement which, although not literally exact, yet enshrines a genuine insight, conveys a useful message. The point I wish to make is that the effectiveness of such assertions would often be seriously impaired by such an alteration of phraseology as would remove the ambiguity; and that, therefore, since clearness of thought is not the only, or indeed the greatest, good, it may be wise to suffer these ambiguities rather than to dim the valuable insights which the ambiguous utterances contain.

Ambiguity does not arise when an assertion is obviously metaphorical, exaggerated, or a short-cut expression. When we say, "Architecture is frozen music"; when Emerson says, "Things are in saddle and ride mankind"; when Jesus says, "He that loseth his life shall find it," we understand the metaphor and run no risk of taking the statement literally. When Emerson writes, "What Plato has thought [every man] may think; what a saint has felt he may feel; what at any time has befallen any man, he can understand," we

allow for the exaggeration. When we read in the Declaration of Independence that "All men are created free and equal," we take that to be an elliptical expression of the truth that all men have a natural right to freedom and to equality of opportunity and privilege. Such literally untrue, yet practically true, statements are hardly ambiguous. But there are others which are more likely to be taken at their face value and so to cause confusion.

For example, when Jesus says, "Ask and it shall be given you, seek and ye shall find, knock and it shall be opened unto you," his assertions sound like a promise, and have been quite generally so construed. Common sense points out that many who ask do not receive, many who seek do not find. And yet the saying is not thereby discredited; for it was by no means a mere exaggeration, whose exacter rendition would read, "To some who ask shall it be given, etc." No, what the saying conveys is rather the truth that the way to find is to seek; nothing is to be won unless one bestirs himself to attain it. It is parallel to the common proverb, "Where there's a will there's a way." Literally, that is untrue; in many cases where there is a will there is no way. But this proverb, like the Gospel saying, is not to be dismissed as a statement of probability—it is, as a matter of fact, not a probability, not literally true even in a majority of cases. Still less is it merely a statement of what sometimes happens; such a statement would have no hortatory value. It is rather a veiled, but highly effective way of conveying the important lesson that it takes determination to succeed. "If you would find a way, you must have the will to find it." "If you wish a door opened you must knock." And now my contention is that the literally untrue statements convey the desired moral so much more effectively than these literally exact statements that they are actually, for practical purposes, to be preferred. To whatever ambiguity results therefrom we must be reconciled.

Again, take Carlyle's tirades against a eudæmonistic ethics—that "pig-philosophy," as he called it. Over and over again he insists that it matters not whether men are happy or not; what matters is not the happiness they get, but the amount of work they get done. Taken literally, he would have to be adjudged in error. It does matter whether humanity is happy or not; and the accomplishment of work would have no value if it did not tend in the end to further human happiness. Yet we can not help sympathizing with Carlyle and feeling that his underlying intuition was true. I have elsewhere phrased that truth thus: "It is one of the surest fruits of experience that happiness is best won by forgetting it. To think much of happiness slides inevitably over into thinking too much of present happiness, and more of one's own than of others' happiness;

it leads to what Spencer properly dubs 'the pursuit of happiness without regard to the conditions by fulfilment of which happiness is to be achieved.'"[1] Why not, then, be content with some such expression of this truth? Because—even if I had Carlyle's organ-tones at my command—my exacter statements are, as preaching, far less effective than Carlyle's paradoxical periods. To make the contrast sharper, compare the two assertions, "I must not make happiness my conscious aim!" and "My happiness doesn't matter!" The second has obviously the greater suggestive value. But it is literally untrue, while the other is not.

A closely related instance of a practical truth masquerading under the guise of a literal falsehood is to be found in the oft-reiterated doctrine of Christian Science—"There is no evil!" To the rest of mankind this is the sheerest nonsense. And yet, watch the illumination that comes to the convert, see what a new and profound insight into human life he has discovered; see the effects in his actually transfigured consciousness. For him there *is* no more evil forthwith. I speak, of course, of those who really grasp the secret; that they do possess a great secret we can not deny, or deny only because we have not personally seen the transformation wrought. So far as practical truth goes, they are right and the scoffers wrong. In a volume now in preparation for the press I have phrased that truth thus: "Evils must not exist for us, must not find a place in our world. Whatever is not good or beautiful or pleasant is to be counted out, thrown overboard, forgotten; is to be as if it were not. Just as when we adopt any ideal we cease to compute and calculate, but throw ourselves whole-heartedly on that side, so in our emotional reaction upon life we are to have eyes only for the good and refuse to see anything else. It is treating the world as we ought to treat our wives and mothers and dearest friends; it is our world, we love it and are loyal to it, for us it shall have no faults." There is, I believe, no untruth mingled with this statement. But I wonder if any one would ever be led to solve his personal problem of evil by reading my words. Tens of thousands have been led to do so by reading Mrs. Eddy's words. And the reason lies not merely in the illusion fostered by taking her words literally—there are some Christian Scientists at least who have no illusion about it—but also, to some extent, in the suggestive power of her literally untrue statements which is lacking in my more sophisticated phraseology. Unfortunate as, for our clearness of thinking, it may be, it seems true that we need the paradoxical form of assertion. Try it yourself, in a serious attempt at auto-suggestion. Say, "I will forget evil, I will banish

[1] I hope I may be pardoned this quotation from my own "Problems of Conduct," pages 85–6.

it from my horizon, refuse to admit its existence," etc. And then say, "There *is* no evil!" The former method may help considerably; the latter method, seriously enough adopted, can really radically turn your conscious experience into a perpetual sunshine. I never, therefore, deny the assertions of the Christian Scientists; to do so involves—without long and often unsuccessful explanation—seeming to deny the tremendously important insight which they are by those assertions blindly, but very effectively, expressing.[2]

Similarly, the doctrine of Salvation by Faith, as expressed by Luther, or Wesley, or in the traditional Christian creeds, sounds like a piece of theological speculation which the intellectually scrupulous should hasten to disavow. Yet to reject it would mean to discountenance a method of saving men from sin which has been, and may still be, of enormous efficacy. We might explain the psychology of the process somewhat as follows: "The unhappy sinner, in many cases, has the power to live aright locked up in his heart, but unable to get control of him because it is blocked by the realization of his sinfulness; the formation of new habits is interfered with by his very concentration of thought upon his previous failures. Suddenly he is told that he need not think of his temptations any longer, that he has but to let go, yield himself up to Christ, or to God, and he will be saved. The suggestion of the possession of power is potent enough to make the power actually sufficient. The mind is fixed upon the goal instead of upon the obstacles, is freed from the demoralization that comes from a remembrance of past weakness, and lives in the atmosphere of attainment." This highly important truth is contained in the Pauline doctrine; Paul himself was actually so saved from his life of restlessness and moral failure. And so, however fantastic, literally taken, the dogma of Justification by Faith may seem, we must confess it is a very useful means of preserving and revealing to men a great practical truth which without it might have been lost to Christian experience for centuries.

Ernest Renan applied this same principle to a belief which is far more literally true for most of us—the belief in God. "The word God being respected by humanity, having for it a long-acquired right, and having been employed in all beautiful poetry, to abandon it would be to overthrow all habits of language. Tell the simple to pass their lives in aspiration after truth, and beauty, and moral

[2] Such a "practically" true manner of speech in relation to this same great truth is to be found, of course, in many besides the Christian Scientists. *Cf., e.g.*, Marcus Aurelius (Bk. II.), "But death and life, honor and dishonor, pain and pleasure . . . are neither good nor evil. . . . Nothing is evil which is according to nature." And Emerson ("History," in "Essays," Vol. I.), "To the poet, to the philosopher, to the saint, all things are friendly and sacred, all events profitable, all days holy, all men divine."

goodness, and your words will be meaningless to them. Tell them to love God, and not to offend God, and they will understand you perfectly."[3] For an agnostic, who has no belief in what people generally mean by God—a conscious Being who rules the world, loves men, and hears their prayers—this position seems to me well taken. Even if no such Being exists, the practical worth of the attitudes connoted by the phrases "Obey God's will!" "Love God!" etc., will remain of perpetual worth to men. "To fear the Lord is to hate evil," the Book of Proverbs tells us; and that is what, as a matter of actual practise, it amounts to—that is, as the pragmatist would say, its cash value. To deny God means to most people to deny the worth of human life, the importance and authority of ideals, the existence of a power that can enter into and transform our lives, the possibility of salvation from sin. And no language can so well convey—at least to men of Christian nurture—these important truths as the familiar Christian phrases; the insight and the vision have become wrapped up in them. To substitute other and colder words would be to lose more than were necessary of the zeal and warmth of the spiritual life. So that a spiritually minded man who disbelieved in the literal existence of a God might well hesitate to proclaim his disbelief, and might continue to use, without any hypocrisy, this hallowed language —considering it, on the whole, the best fitted to express positive truths that he felt to be more important than the denial of theism.

These illustrations might be indefinitely multiplied. Almost every sect and school has stood champion for some practical truth, for some truth which it has *found* to be significant, and whose denial would mean a vital loss. It has phrased this truth in language which was not literally true. The literal untruth of statement has aroused the antagonism of the other sects and schools that have not been on the inside, seen into the real practical meaning of the doctrine, or felt its power. Most of the objections to Christian dogmas have been proper —if the dogmas are to be taken literally. But on the other hand, most of those dogmas have been right, and important, and precious— if we look to the practical truth which they enshrine. Of course, the believer holds usually to the literal truth of his dogma; hence the protracted "conflict between science and religion." But not a few religious-minded men to-day are admitting that their beliefs are but symbolic; the scientific objections are valid, and yet—and yet there is "something in" these beliefs that the unregenerate and hard-headed scientist wots not of. Tolstoy, for example, saw clearly enough the irrational nature of the Church's teaching; yet he was

[3] "Intolerance in Scepticism," in "The Poetry of the Celtic Races and Other Studies." I do not know that Renan ever attempted to generalize this principle.

persuaded that the humble, believing folk had hold of the true secret of life, while he had not; and he had no rest till he found a way to formulate that secret for himself. So is it if one turns the pages of "The Varieties of Religious Experience." Here we are given a glimpse of document after document, expressing belief after belief that we could not possibly hold. Yet these believers saw deeper into life than the skeptic who flouts their credulity; a man must be lacking in sympathetic insight not to feel that. And the Christian Church, in spite of its sad antagonism to clearness of thought and free utterance, in spite of the literal untruth of most of its dogmas, has stood, in a world where spiritual insight is all too rare, for the profoundest and most needed truths that man has ever discovered.

Is this antimony inevitable? Is it, as Emerson said, the unavoidable "fault of our rhetoric that we can not strongly state one fact without seeming to belie some other?" I am afraid that, to a certain extent, it is inevitable. We may discard Paul's doctrine, and Mrs. Eddy's, and the rest. Or we may rephrase their insights in more accurate language. But to do either would involve a practical loss greater than the gain. The language of greatest *power* is precisely the less exact, more figurative language. This is what Arnold had in mind when he insisted so earnestly that the language of the Bible is "literary," "the language of figure and feeling," not "the language of literal fact and science." An expression that is not so "scientifically exact" may be "more proper and adequate to convey what men feel about" a matter.[4] This is what Seeley, too, had in mind when he spoke of "that kind of imaginative eclipse which an object suffers when the shadow of science passes over it." "There are two ways in which the mind apprehends any object, two sorts of knowledge which combine to make complete and satisfactory knowledge. The one may be called theoretic or scientific knowledge; the other practical, familiar, or imaginative knowledge. For practical purposes, accurate scientific knowledge of a thing is seldom sufficient. The greatest trial of human nature lies in the difficulty of reconciling these two kinds of knowledge, of preventing them from interfering with one another, of arranging satisfactory relations between them."[5]

Would not recognition of these two differing uses of language do away with the confusion from which pragmatism suffers? If a belief "works"—as these Christian beliefs do—is the belief thereby proved true? Not in its literal sense, certainly. No belief ever "worked" better, practically, than the Christian Science belief; but that practical success does not prove that there is, objectively, no evil in the world, that all seeming evil is illusion—"error." What it does prove

[4] "Literature and Dogma," Ch. I.

[5] "Natural Religion," Pt. I., Ch. III.

is that there must be "some truth in it," some great insight. So Emerson is right, in a way, when he says, "The religions we now call false were once true." They once *meant* something vital, something real, in men's experience and conduct; now we have only the husks, the verbal formulations, which are, when empty of their soul of meaning, quite palpable untruths. It is becoming popular to argue that Christianity is true because it is verifiable. From a volume just off the press I quote a passage quite typical of up-to-date apologetic: "When men accept the Christian Gospel on faith, they are able to prove it is true in their own experience by the marvelous things it does to them. . . . These things prove the reality and the validity of the Christian faith. They give the only proof of which it is capable, the verification by experience."[6] To which I say heartily, Amen!—if only the reader will realize that the statements in which these valid Christian truths are presented may be, literally taken, quite untrue. What experience can prove is that the Christian way is the best way, the way that glorifies life, brings it inward harmony and joy and peace. Such a way of life constitutes, doubtless, the essence of Christianity. But the obvious truth that Christ's way is the right way, must not buoy up and float a conviction of the literal truth of Christian doctrine such as stands in the way of sound historical or cosmological judgments.

One practical bearing of this recognition of the dual function of language lies in the matter, now much mooted, of clerical veracity and the profession of creeds. May one who longs to join the fellowship of those who seek to follow Christ declare his belief in a creed—or in this doctrine or that—which, if he take it literally, he can not honestly believe? "Ascended into Heaven and sitteth on the right hand of God"—thousands of worshipers recite those phrases weekly; how many literally believe that Christ went *up*, into a Heaven in the skies, and is there seated now upon a throne by the side of God? Every one must judge for himself what other phrases of his creed are as purely symbolic. Certainly, if some may be taken, without explicit acknowledgment, in a merely symbolic sense, all may be. And thousands of ministers and members to-day who cling to the traditional beliefs do accept them simply as the expression, in moving and hallowed, but purely symbolic words, of the great Christian truths which they would be at a loss to know how otherwise to express or openly espouse.

This whole matter of the ethics of profession of belief is vastly complicated; and I am not trying to indicate my feeling in the matter. Elsewhere[7] I have expressed my earnest belief that all

[6] Albert Parker Fitch (President of Andover Theological Seminary), "The *College Course and the Preparation for Life*," pages 120–1.

[7] *E. g.*, in *American Journal of Theology*, Vol. 18, page 257.

creeds and doctrinal statements should be relegated to the background, acknowledged to be what they are, mere stumbling, blundering human attempts to express and explain religious truth; and never thrust upon church-members or ministers as necessary of acceptance. But I should like, on the other hand, to plead with those straightforward, honest people who hate anything that savors of "straddling" or hypocrisy, for a tolerant attitude toward those other brethren of theirs who satisfy their souls best by using the old, hallowed language even though it has ceased to have for them the literal meaning it had for their forefathers. Let not the Unitarian condemn the liberal Congregationalist or Methodist for clinging to the doctrine of the Trinity, or the Atonement, or the Divinity of Christ. Although he may, quite as clearly as the Unitarian, have realized the difference between our modern views of God and Christ and those of the Greek-thinking theologians who formulated those ancient dogmas, yet he fears that by discarding the hallowed phrases, the Unitarian has lost, or is likely to lose, something of great significance from his religious experience. And to help keep alive that experience he deems more important than to show his intellectual enlightenment.

What is true of the "orthodox" doctrines is true in many other fields where true insights, expressed in such a way as to be easily communicable, seem to belie other truths. It is often necessary to point out the literal error; and often possible to make the expression of the truth more accurate without blurring its emotional appeal. But what is most important is to get on the inside, to feel what these superficially untrue statements *mean* to those who so eagerly uphold them, to realize that though they be literally false, yet they may be practically true.

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SOCIETIES

THE NEW YORK BRANCH OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

THE New York Branch of the American Psychological Association met in conjunction with the Section of Anthropology and Psychology of the New York Academy of Sciences on the evening of February 22, at Columbia University. Five papers dealing with various conditions of efficiency were read. Abstracts of the papers follow:

Preliminary Report of an Experiment to Determine the Effect of Air Conditions upon the Accuracy of Judgment of Intellectual Products.[1]—W. A. McCall.

It was shown by Thorndike, Chapman, and McCall that the effect of air conditions, ranging from 68° F., 50 per cent. relative humidity, and 45 cubic feet of air per person per minute, up to 86° F., 80 per cent. relative humidity, and the air unchanged and stagnant, was absolutely the same upon the product produced by and the rate of improvement of certain mental functions. This was true when the young men tested worked at maximal effort and were subjected to any one condition either one day of four hours or five consecutive days of four hours each.

The purpose of the experiment to be described was to ascertain whether this same lack of difference would be found when the conduct of the experiment and the nature of the tests were such as not to stimulate effort, but to encourage carelessness.

This experiment was conducted in the laboratory of the New York State Commission on Ventilation, where any desired ventilation condition could be very accurately maintained. The tests were made upon four male college students who occupied the experimental chamber for six consecutive weeks, five days to the week and seven hours to the day. Six air variables were employed, each condition lasting one week. The range of air conditions was the same as that noted above.

The psychological tests occupied the first three days in each week and consisted in having the subjects assign values to specimens of penmanship and English composition according to the Thorndike Scale for Handwriting and the Hillegas Scale for English Composition, respectively. In all 27,360 judgments were made. The exact value of each specimen of penmanship and composition has been determined and the average error of the subjects' judgments has been calculated for each of the air conditions.

The subjects also gave a numerical comfort statement. These comfort judgments have been averaged for each air condition. The results justify the following conclusions:

1. The hot humid conditions reduced the comfort of the subjects.
2. The comfort of the subject showed no demonstrable correlation with his accuracy of judgment.
3. The function tested was a highly variable one, but it varied irrespective of the time spent upon the test.

[1] This experiment was a part of the work carried on in 1914 by the New York State Commission on Ventilation, under the general supervision of Messrs. E. A. Winslow, D. D. Kimball, Frederic S. Lee, James A. Miller, Earle B. Phelps, and Edward L. Thorndike.

4. No one condition more than another affected detrimentally the accuracy of judgment of handwriting or composition.

Experimental Studies in Recall and Recognition.—EDITH F. MULHALL.

Experiments were reported concerning, (1) the influence of determination to remember, and (2) the effect of primacy and recency on both recall and recognition. The results showed: (1) Determined recall (recall of material for which there was a determination to remember) differs from undetermined recall more than determined recognition differs from undetermined recognition. (2) The difference between determined recall and determined recognition is less than that between undetermined recall and undetermined recognition. (3) The factor of determination influences the amount of material remembered which can be associated with other material remembered. (4) Primacy and recency both influence recall memory. The influence of each on recognition is less than on recall, but is greater for material devoid of associations and less for material with associations. A detailed account of the experiments will appear in the forthcoming issue of the *American Journal of Psychology.*

Practise and Its Transfer-effects in Cancellation Tests.—M. A. MARTIN.

The object of this investigation is to discover the transfer-effects of practise in canceling a-t words upon certain other cancellation tests. The subjects were divided into two groups: thirty-six in the practise group and forty in the control group. Both groups were tested with a series of seven cancellation tests, after which the practise group was trained in canceling words containing a and t in English prose. The practise periods were ten minutes long and there were four of them each day for sixteen days. Precautions were taken to impel the practise group to a maximum of improvement, and also, in the meantime, to keep the remaining forty that constituted the control group interested in their part of the experiment. In the training series the practise group improved in accuracy from 83 per cent. to 96 per cent., and from an initial average performance of 10.2 cancellations per minute to a final average performance of 26.6 cancellations per minute. After the conclusion of the practise both groups were reassembled and tested with the same seven tests used before the practise began.

The results justify the following conclusions:

1. In the group of tests in which the elements determining the canceling were the same or partially the same as the elements determining the canceling in the practise series the transfer-effects appear as facilitation.

2. In the group of tests in which there were none of the elements

which determined the rate of canceling in the practise series the transfer-effects are without appreciable or reliable manifestation.

3. In the group of tests in which the elements determining the canceling were among those to be neglected in the practise series, while the elements determining the canceling in the practise series were among those to be neglected in these tests the transfer-effects appear as interference.

The Influence on Retention of Conditions Favoring Quickness of Learning.—R. S. WOODWORTH.

Results cited from the literature and from the speaker's own experiments showed that in the main an influence which made for quickness of learning made also for good retention of the matter learned. But there were exceptions to this rule, the most important being that long lists of syllables, or other large masses of matter to be learned, though slowly learned, were strongly retained. This result has usually been explained by reference to the additional study given to the elements of the longer list because of their presence in the long list. An experiment was reported showing that this was not the full explanation. By the method of paired associates, lists of 5, 10, 20, and 30 pairs of unrelated English words were presented, each list receiving three readings, with test and prompting after each reading. The shorter lists were naturally more completely mastered in the three readings than the longer lists. Nevertheless, a test two days later showed that the pairs of the longer lists were much better learned than those of the shorter lists. From the lists of 5 pairs, 6 per cent. were retained; from the lists of 10 pairs, 15 per cent. were retained; from the lists of 20 pairs, 37 per cent. were retained; and from the lists of 30 pairs, 34 per cent. were retained. Retrospective notes by the 25 subjects indicate that length of list acts as a stimulus to effort, and that this effort goes to the discovery of meaningful connections between the members of a pair. Shortness of list favors quick rote learning, without much attention to meaning, while length of list favors meaningful apprehension, which in turn favors retention.

The Energy Error in Interference Tests.—J. J. B. MORGAN.

This paper was the report of an investigation intended to ascertain the effect of noisy conditions upon human activity. The procedure of the experiment consisted in having the subject work continuously at a task, the time for each step being recorded automatically. While thus working severe noises were introduced. Each subject worked for about one hour, a record being taken for the entire time.

The results show that: (1) When the disturbing noises were first introduced they caused a retardation in the speed of the work.

(2) After the first slowing effect, the subject exceeded the speed he had made before the disturbances were introduced. (3) After the removal of the disturbance the subject did slower work. (4) The records of errors do not show any inferior grade of work during the disturbance. (5) Since no index was obtained as to the amount of effort put forth by the subjects, these results throw no light on the favorability or unfavorability of the noisy conditions. They have a purely subjective intent, namely, that the subject is able to call forth enough extra energy to overcome any effect the noise may have.

Two attempts to get such an index were reported. One was by recording the involuntary difference in pressure that the subject exerted upon a dynamometer while at work. With an improvement in technique this method gives some promise. The other was to take a continuous respiration record. Measuring the time of each expiration and inspiration and finding the ratio between them (dividing the expiration by the inspiration) gives a means of comparing the different respirations numerically. In two experiments performed, this method gave definite results. They showed that this ratio increases as the subject begins work and rises to a maximum. As he becomes accustomed to the work it drops somewhat. Noises cause a marked increase in the ratio, and removal of the disturbance a decrease. It is planned to ascertain whether future experimentation will corroborate these results.

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REVIEWS AND ABSTRACTS OF LITERATURE

What Can I Know? An Inquiry into Truth, its Nature, the Means of its Attainment, and its Relation to the Practical Life. GEORGE TRUMBULL LADD. New York: Longmans, Green and Company. 1914. Pp. vi + 311.

This is the first in a series of four projected manuals offering in a popular form the main points in the philosophical system of the Yale idealist. These small volumes are to cover the subjects of knowing, doing, believing, and hoping. The first, now before us, concerns epistemology. The meaning of the question—"What Can I Know?"—suggests a variety of answers from different points of view. The limits of knowledge are set between gnoticism and agnoticism, between knowing too much and knowing too little. There are occultists who claim, by some mysterious means, to know how to square the circle and how to apply perpetual motion. There are agnostics who have "too quickly and incontinently concluded that they could not know of the existence of a good God, of a soul of their own and in their own keeping, and of the reasonableness of the grounds for a hope of immortality."

In these words we have the first hint of the three main tenets of Ladd's system. These tenets are absolutism, personalism, and supernaturalism. Yet while the book's purpose seems that of a Christian apologetics, there are certain admissions which appear to frustrate that purpose. The first is the use of the Kantian distinction between subjective sufficiency, or conviction, and objective sufficiency, or certainty. This distinction renders ineffective the author's favorite formula—"thinking one's way through a subject." In place, then, of absolutism we reach pluralism, in place of a block universe, seen practically alike by all "thorough" thinkers, we have a multiverse of many men of many minds. A like fate befalls the second tenet, that of personalism. It is claimed that all trustworthy scientific processes is one of personifying, that "the world of things can be known at all, *if known as it really is*, only after the analogy of the personality of the knower." If Ladd had left out the words we italicize, his remarks would form an interesting contribution to pan-psychism. But it is unfortunate that the writer adds to the argument from analogy the argument of dynamism, not in a suggestive, but in a dogmatic way. We therefore feel tempted to rearrange the reasoning as follows: The world is not known as a collection of dead stuffs; it is known as a network of centers of force; these forces are *perhaps* individual wills. Now baldly to identify force with will, as does Ladd, is to miss the very soul of the machine. From the not-dead we are led on to the dynamic, and are then prone to ask, does not pan-dynamism lead on to pan-thelism, the doctrine of an all-diffused force to the doctrine of an all-embracing will? Dogmatically to assert that force *is* will, is to commit the fallacy pointed out by John Fiske when he said that primitive man referred natural phenomena to the wills of personal powers simply because he had nothing else with which to compare them. And yet, as Ladd explains, to range oneself with the physico-chemical sciences, with the strictly impersonal, is not entirely satisfactory. To talk of selves as seats of energies; of energies instead of wills, is to use terms no more representative of the life of the world than the symbols x and y. As Paulsen has suggested pan-psychism, as a modified form of personalism, has had great allurement for scientific minds from Leibniz to Fechner. With this temptation to unify the whole after the analogy of a larger self, it is strange that Ladd should attack Bergson's intuition as discrediting the intellect. The Frenchman's point of view would be fallacious if it were merely negative. But the doctrine of intuition, as presented in "Creative Evolution," is offered not as a negation, but as a supplement to that very intellectual, chemico-physical method which Ladd considers inadequate to explain a living world. Indeed, he proceeds along the same line as Bergson when he attacks formal logic, and in contradiction to the principle of identity, asserts that the very existence of everything consists in perpetual change, the very essence of the self in ceaselessly changing.

With this loosening-up of the old metaphysics, the American acknowledges that the same proof and the same evidence have very different effects upon different minds. In short, instead of "being sure of what we know" he confesses that there is absolutely no sure passage, either for

the individual or for the race, from subjective conviction to objective certainty. Under these circumstances it is hard to see the force of a subsequent statement that "there is no scientific or philosophical school, old or new, that is not virtually some attempt at a system of idealism." Such a statement appears to fit better the author's chapter on "taking for granted" than that on "the degrees and limits of knowledge." The "so-called" pragmatist, for example, who considers himself both "scientific" and "philosophical" is quite unable to reach Ladd's limits of knowledge. The typical pragmatist stops short with a pluralistic universe, because he can not reason out a monistic. He accepts an "ill-conditioned jumble of antagonistic existences" simply because he has evidence that this "multiverse" is not "an orderly and sublimely beautiful and rational whole, a cosmos, a Divine Evolution."

In his crucial chapter on "Knowledge and Reality" Ladd claims that the "so-called" pluralistic universe is a rhetorical appeal to the emotions, and a return to a more primitive conception of disparate and ever conflicting worlds. It is hard to accept either of these strictures and for two reasons. The pragmatic appeal to the emotions was in large measure due to certain inadequacies of intellect.

As Ladd himself says: "Reality is not constructed on the square, nor after the strictest of the logic of Aristotle nor the dialectic of Hegel." Again, if pluralism be a return to primitive belief, so is Ladd's constant use of the anthropomorphic argument. It is one thing to hold that what I can know is determined by human limitations; it is another to assert that anthropomorphism is inescapable, that total reality ends in a "Personal Absolute," that the "Sublime Whole" is "Absolute Self."

WOODBRIDGE RILEY.

VASSAR COLLEGE.

Feeble-Mindedness: Its Causes and Consequences. H. H. GODDARD. New York: The Macmillan Company. 1914. Pp. xii + 599.

Dr. Goddard's data consist of the results of investigations by field-workers into the history of three hundred and twenty-seven families represented in the Vineland training-school for defectives He groups his genealogical charts into five classes: cases where feeble-mindedness is certainly hereditary; cases where heredity is highly probable; cases where a neuropathic taint exists in the family, although there is no inherited feeble-mindedness; cases where the defect is clearly due to some accident either to mother or child, and cases where no cause could be discovered. There is also a group of unclassifiable cases which were not counted in the results because nothing definite could be learned about them.

The trustworthiness of the material gathered by field-workers on family histories Dr. Goddard thinks may be granted, because in every case where the mentality of a person not actually known to the worker was in question he was given the benefit of whatever doubt might be possible: thus the reports err, it is believed, rather on the side of conservatism. Reinvestigations of the same family have shown this to be the case.

The most striking, and to the theoretical psychologist most interesting, result of the work is the indication that feebl-mindedness is a unit character, and that it is recessive. The family trees make it clear that in no case where both parents were feeble-minded have they produced a single normal child. If feeble-mindedness were a dominant, that is, a positive character, a weak-minded person might have received his trait from one parent only, and he would then, while outwardly indistinguishable from any other weak-minded person, be able to have some normal children. But if feeble-mindedness is due to the lack of something, rather than to the presence of something, then two parents who both lacked this something could not fail to transmit their defect to all their offspring. If feeble-mindedness is then due to the lack of a definite element, this missing element must be that to which normal intelligence is due. It seems strange, when we think of the great complexity of the processes which come under the head of "intelligence," to conceive that it can be a unit character. But as Goddard suggests, the single character may be the presence of some chemical substance which is necessary for the continued maturation of the nervous system. The grade of the feeble-mindedness would then be determined by the point in growth at which this substance gave out.

In general, the author's results indicate the overwhelming importance of heredity as a cause of mental defect. Alcoholism, for example, plays apparently the rôle of symptom rather than cause. Neuropathic taint (under which head cancer is included, for reasons mysterious to the reviewer) is, on the other hand, an important factor. One type of defective, the Mongolian, is more frequently found in families free from any taint, and its cause is therefore suggested to be some physical or mental shock to the mother, or uterine exhaustion in the case of the last-born of large families. The clearly hereditary cases of feeble-mindedness, by the way, are usually those of higher grade, and this is explained on the principle that when mental defect is inherited the offspring have about the same degree of mental development as their parents; the lowest grades of mental defectives do not reproduce.

The most novel feature of Dr. Goddard's practical suggestions about the treatment of the feeble-minded is to the present reviewer his optimism concerning those of higher grade. While he realizes that eugenics demands the prevention of reproduction in the mentally defective, and earnestly recommends the increase of segregation, yet he suggests that we may make the best of the fact that the feeble-minded will continue for many years to reproduce. "Does not our horror at the mating of the feeble-minded and the production of more feeble-minded offspring arise largely from our experiences with them up to the present time, and is not this complicated by the bad environment and mistreatment of which we have spoken? When we have learned to recognize these people and how to treat them, will not the situation be entirely changed? May it not be possible that we will find use for all these people of moderate intelligence, and that the production of so many high-grade feeble-minded is only the

production of so many more people who are able and willing to do much of the drudgery of the world, which other people will not do?"

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JOURNALS AND NEW BOOKS

THE MONIST. January, 1915. *St. Thomas in India* (1–27): RICHARD GARBE.—The legend that St. Thomas taught in India is a remodeling of a Buddhist original. The Thomas-Christians fled from Persia in the fourth and fifth centuries to Southern India and could not have influenced native religions before the twelfth century, since previous to that time religious activity was confined to Northern India. *Sensation and Imagination* (28–44): BERTRAND RUSSELL.—Is the difference between sensation and imagination one in the objects of knowledge or in the relations? Together with the differences between images and sense-data, there is a usually recognized difference in the relations of imagining and sensating. There is no way to decide whether the relation of the image to the subject is simultaneous or non-temporal. If simultaneous, the "unreality" of images consists in their failure to fulfil the correlations fulfilled by sense-data. If non-temporal, it consists in their not being given in a definite position in time. Sensation is a relation involving simultaneity between the subject and the object, and the simultaneity is deducible from the nature of the experience involved. *Orthodox and Liberal Christianity: A Media Via* (45–78): K. C. ANDERSON.—There is a "religious" truth as well as a "historical" truth. Liberalism (the basing of Christianity solely upon the fragment *Q*) believes only in historical truth; orthodoxy treats religious truth as historical. The *media via* is to accept orthodoxy as symbolic—whence results a Wordsworthian-Platonic doctrine of the Fall, which the author holds to be the central point of Christian doctrine. *Newton's Hypothesis of Ether and of Gravitation from 1672 to 1679* (79–106): PHILIP E. B. JOURDAIN.—An historical account, continuing the author's series upon Newton, of Newton's views on ether and "whether gravitation is an essential property of matter." *Some Medieval Conceptions of Magic* (107–139): LYNN THORNDIKE.—A collection of twelfth- and thirteenth-century discussions upon magic, showing little agreement beyond the general opinion that it is "true but evil." *Criticisms and discussions: The Purely Ordinal Conceptions of Mathematics and Their Significance for Mathematical Physics:* PHILIP E. B. JOURDAIN. *Magic Stars:* W. S. ANDREWS. *Recent Periodicals. Book Reviews: Encyclopedia of the Philosophical Sciences,* Vol. I, *Logic.*

Coker, Francis William. Readings in Political Philosophy. New York: The Macmillan Company. 1914. Pp. xv + 573.

Gill, Richard H. K. The Psychological Aspects of Christian Experience. Boston: Sherman, French, and Company. 1915. Pp. 104. $1.00.

Taylor, Henry Osborn. Deliverance. New York: The Macmillan Company. 1915. Pp. 294. $1.25.

NOTES AND NEWS

At a meeting of the Aristotelian Society on March 15, Dr. W. Tudor Jones read a paper on "The Philosophy of Values." "Natural science deals with origins and laws, philosophy with a view of life. Philosophy starts with the phenomenology, not the natural science, of consciousness. The total content of consciousness as revealed in the thinking, feeling, willing, being in all the relations of life is its subject-matter. Hence the two main divisions of philosophy, theoretical and practical or axiological—for man is not a mere passive spectator in the universe, but capable of exercising his will at least upon a portion of it. Values exist only in relation to a subject; the sciences of them are, therefore, disciplines. They deal not with a theoretical content, but with the relation of a subject to some end or value. Logic is a theoretical discipline in so far as it presents the subject with a pathway to truth. Esthetics, ethics, and religion deal with values in their relation to man's life. Beyond the values themselves as they affect the individual, there are the over-individual values which relate to the conjoint life of the community. Such a value is presented to us by custom—an over-individual value which the subject receives as a social inheritance, but does not create. It is objectified in the general will. Neither of the three systems of values—logic, esthetics, and ethics—touches the whole nature of man, yet only one of them can occupy the consciousness at one time. The final quest of life is for a unity which embraces the three. This unity constitutes the religious or metaphysical value of life."—*Athenaeum.*

The New York Branch of the American Psychological Association met in conjunction with the Section of Anthropology and Psychology of the New York Academy of Sciences on April 19. The following papers were read: "Relative Performance of Negroes and Whites in Some Mental Tests," Mr. G. O. Ferguson, Jr.; "Distribution of Time in School Exercises," Professor Robert A. Cummins; "Report on Experiments with the Hampton Court Maze," Professor H. A. Ruger; "Completion Tests with Public School Children," Mr. R. Trabue; "An Experimental Study in Values," Mr. M. A. May; "The Study of Foreign Languages in Relation to Standing in Psychology," Professor Will S. Monroe; "Scientific Method in the Interpretation of Dreams," Mr. Lydiard H. Horton; "Some Experiments in Recall," Dr. Garry C. Myers.

Mr. Bernard Bosanquet has brought together in a small volume some "Lectures on Esthetics," which he delivered at University College, London, last autumn. The first lecture deals with "The General Nature of the Esthetic Attitude—Contemplation and Creation"; the second with "The Esthetic Attitude in Its Embodiments—Nature and the Arts"; the third and last with "Form of Esthetic Satisfaction and the Reverse—Beauty and Ugliness." The volume has been issued by the Macmillan Company.